

Warfighters And Humanitarians: Integrating Technology To Save Lives

CSC 1997

Subject Area - Warfighting

EXECUTIVE SUMMARY

Title: WARFIGHTERS AND HUMANITARIANS: INTEGRATING TECHNOLOGY TO SAVE LIVES

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Thesis: The Department of Defense (DoD) and civilian relief agencies (non-governmental organizations--NGO) have not effectively integrated communication and data system technologies into their combined humanitarian assistance and disaster relief operations.

Background: Future humanitarian assistance and disaster relief missions will require DoD forces to integrate with NGOs. Voice and data communications, critical at all levels, are most challenging at the tactical level. The tactical Civil-Military Operations Center (CMOC) has developed into the binding organization between the military and NGOs. Operations Provide Comfort, Sea Angel, Restore Hope, and Support Hope provided four common themes concerning tactical level military-NGO communications: daily face-to-face meetings have been the most effective communications means; NGOs do not have the capability to provide themselves robust communications capabilities; military commanders often desire to support NGOs communication efforts, allowing for improved military-NGO relief efforts; and the NGOs must have a need to communicate with the CMOC.

Today's communications interfaces can take three forms: meetings, single channel radio (SCR) communications, and host nation infrastructure use. Military-NGO meetings must be tailored to emphasize relief, vice warfighting, and provide the NGOs utility. These meetings will continue to be crucial for CMOC functionality. SCR has inherent advantages and disadvantages--for each operation the use of SCR must be considered as a coordination tool between the military and NGOs. The fundamental advantage of SCR is timeliness, while its disadvantages include security (equipment and personnel), legal issues, and NGOs logistic and fiscal supportability. Analysis of host nation infrastructure capabilities for radio, telephone, and data systems integration must be accomplished before each operation.

Recommendations: Given the common themes and existent systems, the military and NGOs must explore current and developing technologies that will enhance integration--as we move into the 21st century, this exploration must be a joint effort. Commercial-off-the-shelf radio systems must be procured by the military to ensure a common operating environment. Cellular phone systems, with their flexibility and easy use, must be examined for their potential applications in humanitarian operations. Ongoing software initiatives must be merged, ensuring compatibility and integration amongst all relief participants. The problem of moving packets of data around the "battlefield" must be resolved through innovative ideas such as equipment assignment to forward deployed units that support the military, NGOs, host nations, and coalition forces, with

Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 1997	2. REPORT TYPE		3. DATES COVERED 00-00-1997 to 00-00-1997		
4. TITLE AND SUBTITLE Warfighters and Humanitarians: Integrating Technology to Save Lives			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. marine Corps, Washington, DC, 20380			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 54	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

follow-on equipment based with the Joint Communications Support Element. The technologies of the future must be evaluated and incorporated into the tactical environment. Finally, there must be a culture shift within the military to ensure that humanitarian assistance and disaster relief operations are recognized as legitimate military operations, receiving the training and education emphasis they deserve.

**WARFIGHTERS AND HUMANITARIANS:
INTEGRATING TECHNOLOGY TO SAVE LIVES**

Past policy might have changed irrevocably, on 9 December 1992, when U.S. Marines landed "from the sea" at Mogadishu, Somalia--not to close with and destroy the enemy and seize advance naval bases, but to enable relief missions to carry out food and medicine to tens of thousands of people on the edge of starvation.¹

Hardly a day passes without headlines announcing a major humanitarian plight or natural disaster somewhere in the world. Millions lack basic health services, safe drinking water, adequate medical care, and suffer from malnutrition. More are exposed daily to the horrors of AIDS, malaria, and other infectious diseases. Localities continue to be subjected to the brutal atrocities perpetrated by governments, tribes, insurgents, or local police forces. Natural disasters continue to strike and cause destruction in both developed and developing countries, eroding public services and causing widespread famine, disease, and food shortages.

To combat effects of humanitarian horrors and natural disasters, President Clinton in the National Security Strategy² and General Shalikashvili in the National Military

¹ LtGen Henry C. Stackpole III and Col Eric L. Chase. "Humanitarian Intervention and Disaster Relief: Projecting Military Strength Abroad to Save Lives." *Marine Corps Gazette*, vol. 77, no. 2 (February 1993): 16.

² The White House, *A National Security Strategy of Engagement and Enlargement* (Washington, DC: GPO 1995), ISBN 0-16-048558-4, iii and 17.

Strategy³ have declared "peacetime engagement" as integral to America's overall global strategy. The National Military Strategy describes peacetime engagement as "a broad range of non-combat activities undertaken by our Armed Forces that demonstrate commitment, improve collective military capabilities, promote democratic ideals, relieve suffering, and enhance regional stability. The elements of peacetime engagement include military-to-military contacts, nation assistance, security assistance, humanitarian operations, counterdrug and counterterrorism, and peacekeeping."⁴

The Clinton administration has employed the Department of Defense (DoD) as one of its primary agencies for such operations, as Patricia Irvin writes, "DoD is uniquely qualified to participate in these efforts by virtue of its ability to make available--often on short notice--its highly trained and skilled personnel and high-quality resources."⁵ As we move into the 21st century, it has become increasingly clear that the U.S. military is no longer just a fighting force. Rather, because of its "breadth of assets, global reach, and rapid responsiveness,"⁶ DoD forces will find themselves deployed with other U.S. agencies (most commonly with State Department offices), United Nations (U.N.) agencies, non-governmental organizations (NGO), private organizations (PVO), international organizations (IO), and other countries' military forces supporting humanitarian assistance operations.⁷ These assets, specifically communications and lift

³ Joint Chiefs of Staff, *National Military Strategy of the United States of America 1995* (Washington, DC: GPO, February 1996), ISBN 0-16-045531-6, ii and 9.

⁴ Joint Chiefs of Staff, ii.

⁵ Patricia L. Irvin. "Role of DOD in Humanitarian Assistance." *Defense Issues*, vol. 9, no. 46 (1994): 1.

⁶ Stackpole and Chase, 16.

⁷ The term "humanitarian assistance," for this paper, is defined as any operation that involves human suffering due to war, strife, political or economic ruin, and natural disasters that cause severe damage.

capabilities, make the military crucial to peacetime engagement.

DoD has defined four types of foreign⁸ humanitarian missions: relief missions that provide prompt aid and the distribution of relief supplies; dislocated civilian support missions that provide camp organization, provisions, and placement services; security missions that establish and maintain conditions to allow for relief operations; and technical assistance and support functions that provide short-term relief assistance.⁹ The extent of U.S. military involvement in any of these missions will be dictated by the domestic and international political situation, the operational context (unilateral, multinational, or U.N. response),¹⁰ and the magnitude of the crisis. While conditions predicated military involvement normally coincide with unstable or non-existent government and little or no infrastructure, if substantial damage or plight exists, the President may call upon DoD, especially for its command and control and lift capabilities.

Unlike military operations, U.S. forces are usually not the "first to fight" on the humanitarian battlefield. More often, the military will deploy to areas where civilian relief agencies are already operating, and will continue to operate after military forces depart. These agencies are "independent, diverse, flexible, grassroots-focused, primary

⁸ This paper will not address domestic humanitarian assistance or disaster relief efforts. These are managed by the Federal Emergency Management Agency (FEMA) in conjunction with PVOs. Military-civilian interfaces are normally with the National Guard.

⁹ Joint Pub 3-07.6, *Joint Tactics, Techniques, and Procedures for Foreign Humanitarian Assistance* (draft): I-3 to I-6.

¹⁰ Unilateral response would only involve the U.S. and the host nation, multinational response would involve more than one nation (and its military), and a U.N. response would be organized, funded, and manned by U.N. forces.

relief providers."¹¹ Referred to generically as NGOs,¹² each type of agency has a unique function. The most common civilian relief agencies, NGOs, are transnational organizations composed of private citizens that provide a broad array of services. Normally U.S. based, PVOs are similar to NGOs in their organization and functions. Organizations that have global influence (such as the Red Cross) are defined as IOs. They are the largest and most influential relief agencies. The relief agencies vary in size, experience, capabilities, and resources.¹³ Although the U.S. government has developed lines of communication within itself, there are no specific hierarchies or structural lines between the government and civilian relief agencies (NGOs).¹⁴

LEVELS OF "WAR"

Both military and civilian organizations support humanitarian assistance efforts through their own structural hierarchy (Figure 1). Each "warfighting" level is represented and each agency contributes vital functions to the operations. While a purely military operation is much "cleaner" because of the established hierarchy, the interworkings between and across the levels provide significant challenges during humanitarian assistance operations. The significant role played by relief organizations in humanitarian operations demands their interests be represented at every level.¹⁵

¹¹ Joint Pub 3-08, *Interagency Coordination During Joint Operations* (Vol. I), 9 October 1996: II-18.

¹² The term NGO will be used generically for NGO's, PVO's and IO's in this paper.

¹³ Joint Pub 3-08 provides a detailed explanation of NGO's, PVO's, and IO's, along with their basic capabilities and points of contact.

¹⁴ See Joint Pub 3-08 for detailed explanations.

¹⁵ Joint Pub 3-08, III-25.

	DoD	US Agencies	United Nations	Relief Agencies
Strategic	-NCA -SecDef -Joint Chiefs of Staff -CINC	-Department Secretaries	-UN Hq -Functional Hq	-International & National Hq's
Operational	-CINC -CJTF	-Ambassadors -Regional Offices	-Special Reps	-Regional Offices
Tactical	-CJTF -Components	-Ambassadors -Field Offices -USAID Teams	-UN Military Forces -UN Teams	-Field Offices -Relief Workers

Figure 1
AGENCY ORGANIZATIONAL STRUCTURES¹⁶

At the strategic level institutionalized coordination between agencies has recently developed, and efforts continue at the U.S. agencies, U.N., and relief agencies to resolve philosophical and operational differences. The military has provided its commanders with basic guidance and policy through Joint Pub 3-08 (*Interagency Coordination During Joint Operations*) and Joint Pub 3-07.6 (*Joint Tactics, Techniques, and Procedures for Humanitarian Assistance* [draft]). Both address the military-civilian relief organization interface at the strategic level and the importance of developing relationships that will build the bridge towards a unity of effort.

As the link between the strategic and tactical levels, the operational level provides the bridge for successful operations. In pure military operations, the operational level is closely tied to the tactical situation. The same is true for humanitarian operations. Humanitarian tactical-level operations focus on the relief workers' efforts while the logistical work of moving supplies in-country (the key to success) transpires at the operational level.

¹⁶ Joint Pub 3-08, i-6.

The tactical level is the "tip of the spear" for both combat and humanitarian operations. It is the most challenging level for interaction between agencies, for it is here that the mission of coordinating multiple military forces and civilian agencies towards one common objective resides. Compounding this challenge is the fact that purely military command and control methods will not succeed when dealing with relief agencies who do not have the knowledge, resources, or desire to operate like with military forces.

From a technical standpoint, tactical level coordination requires equipment (hardware and software) compatibility (or interoperability). Joint Pub 1-02, *DoD Dictionary for Military and Associated Terms*, provides two definitions for interoperability:

1. The ability of systems, units or forces to provide services from other systems, units or forces and to use the services so exchanged to enable them to operate effectively together.
2. The condition achieved among communication-electronics systems or items of communication-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users.

The challenge for U.S. forces is to closely coordinate (communicate) with civilian relief agencies (IO, NGO, PVO) that are poorly equipped to handle the communications interfaces required for voice (radio and telephone) and data (computer) circuits.

RELATIONSHIPS: THE KEY TO IT ALL

*For all our experience and compassion, we in the relief and development business do not have the capacity to deal with such large-scale catastrophes without help. Help from the military is not something we should begin to take for granted or rely upon in all cases. But there are extraordinary circumstances that call for responses--manpower, equipment, expertise, transport, and communication capability--that only the military can deploy.*¹⁷

The relationship between organizations is critical to mission accomplishment during any operation. Nowhere is this more true than during humanitarian assistance operations. The integration and coordination of military, U.S. agencies, civilian relief agencies, U.N. agencies, and host nations bring a unity of effort to the operation and act as a force multiplier. With the varied capabilities, personalities, and cultures that each organization brings to the relief effort, it is critical that U.S. military forces fully participate and help establish working relationships with the civilian agencies supporting relief efforts. Joint Pub 3-07.6 states, "Relationships with these organizations [NGOs] need to be based on mutual understanding of lines of communications, support requirements, procedures, information sharing, capabilities, and most important, mission."¹⁸ This relationship may be difficult to foster given the different personality traits and cultural attitude that is normally divergent between the military and relief organizations. Joint Pub 3-0 states, "Efforts must be coordinated despite philosophical and operational differences separating agencies."¹⁹ To facilitate this relationship, the military (and U.N. if involved) may establish three operations centers that directly interface with the civilian agencies. At the strategic level, the Humanitarian Assistance Coordination Center (HACC) provides

¹⁷ Joint Pub 3-08, II-19.

¹⁸ Joint Pub 3-07.6 (draft), II-12.

¹⁹ Joint Pub 3-0, *Doctrine for Joint Operations*, 11 February 1995: v.

interagency planning and coordination. A Humanitarian Operations Center (HOC) provides the operational link, coordinating the overall relief strategy. The HACC and HOC will normally have personnel from the military, U.S. State Department, host nation, U.N., and NGOs represented.

At the tactical level, the Civil-Military Operations Center (CMOC)²⁰ provides on-site relief workers the coordination means with military forces for security, logistics requirements, and technical support issues. Communication among tactical level agencies is most critical--direct links between commanders and civilian workers should be established for effective coordination and decision making. The CMOC is manned by military forces, but can also have NGO personnel. Additionally, host nation and U.N. agencies will usually include a member of their staffs in the CMOC. It must be noted that the CMOC is not always a facility, but rather a coordination concept.²¹ This point is crucial when discussing the "CMOC's capabilities" from a technical standpoint. Figure 2 provides a notional organization relationship chart for a humanitarian assistance or disaster relief operation.

²⁰ The terms HACC, HOC, and CMOC have recently evolved. Previous humanitarian operations have used different terms, but the functions have been essentially the same as the HACC, HOC, and CMOC.

²¹ Capt Chris Seiple, USMC, *Square Dancing Into The Future: The US Military/NGO Relationship and The CMOC in Times of Humanitarian Intervention*, Naval Post Graduate School Thesis (Monterey, CA: December 1995), 59-61. Further referred to as Seiple Thesis.

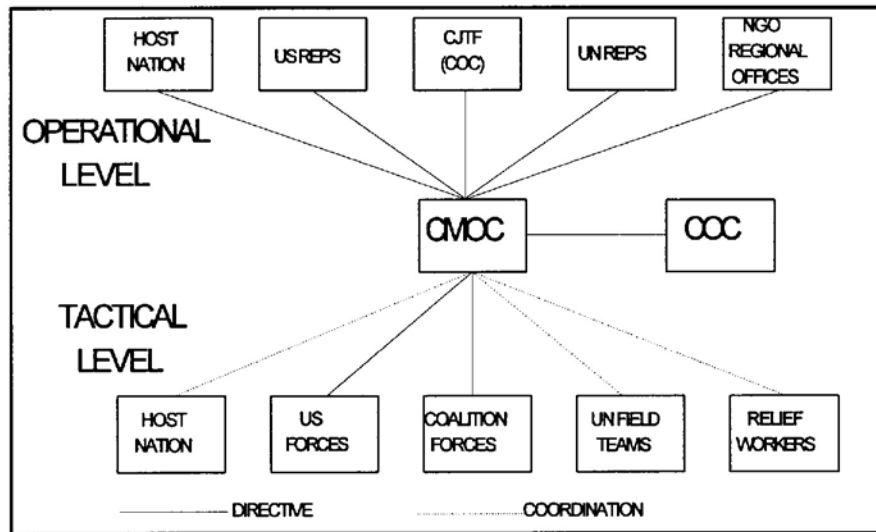


Figure 2
NOTIONAL ORGANIZATION RELATIONSHIP

Expectations by NGOs are a significant part of the military-NGO relationship, especially with regard to communications support. With NGOs having an "all pervasive and permeating attitude"²² about the military, they expect a robust and flexible system present if military forces arrived before them. Interestingly, NGO expectations are very low when they have been on scene for a considerable time before U.S. forces arrive. This paradox may occur because of the NGO workers' myopic view of the operation and exaggerated expectations of military capabilities. One perception is if NGOs have survived without the military for a time, they may consider the operational advantage they can gain from DoD command and control systems as minimal. In this case, they under estimate the military's capability.

²² Capt Chris Seiple, USMC, Action Officer, Strategic Initiatives Group, Planning, Policy, and Operations, HQMC, interview by author, 2 January 1997. Further referred to as Seiple Interview.

FOUR HISTORICAL PERSPECTIVES: SOME COMMON THEMES

Operations Provide Comfort (southeast Turkey, northern Iraq, April 1991), Sea Angel (Bangladesh, May 1991), Restore Hope (Somalia, December 1992), and Support Hope (Rwanda, July 1994) offer four unique views of communicating at the tactical level of a humanitarian operation. While different in mission objectives, scope of plight, and level of military-NGO interface, the operations have two common themes. First, they represent the U.S. military's most extensive efforts in humanitarian relief. Second, the four operations cover the entire spectrum of potential missions as defined in Joint Pub 3-07.6 (draft).

Provide Comfort

*Right from the beginning we had private organizations that were in here that were working side by side with us. These organizations were located all over the area of operations, in the border camps, eventually in northern Iraq, at our aerial and seaports of debarkation.*²³

As the Kurdish people streamed into Iran and Turkey, the U.S. military had no idea the scope of mission they were about to undertake. Beginning with airlifts, and gradually moving towards a longer term stabilization force, the U.S. military, fresh off the Desert Storm victory, was thrust into the NGO world of humanitarian assistance operations. Tasked to stop the suffering and returning the Kurds to their native localities, the military had to deal with organizations that were as strange to them as the military was to the NGOs. Before the military could coordinate with the NGOs, they had a valuable lesson to learn. "The military was introduced to the greatest strength and greatest weakness of

²³ BGen Anthony C. Zinni, USMC, *Operation Provide Comfort*, Transcript of Combined Task Force Provide Comfort Historian. Incirlik Air Base, Turkey, 10 June 1991.

the NGO community: the ability to go anywhere anytime with no one's approval."²⁴

Dealing with this lack of control and coordination was the biggest hurdle the military had to overcome. The NGOs had some lessons to learn too, mostly about the culture and capabilities of the military. The relief workers quickly learned that the military was as compassionate and caring as them, while bringing along capabilities beyond the scope and means of NGOs. Once both sides broke their stereotypes, the business of relief began.

When the initial wave of DoD forces and NGOs arrived at various camps in Turkey, all recognized the requirement for some form of coordination. The austere operating environment and limited forces in-country meant the only coordination option was face-to-face meetings. These meetings became a regular event, and although they had no structure, provided the only forum for military-NGO interaction. Functioning as round-table discussions, they became the initial lifeline for coordination in the earliest stages of Provide Comfort.

With the situation developing, the military and NGOs established headquarters at Diyarbakir, Turkey. Again, the face-to-face daily meetings became prominent. Besides the military and NGOs, the U.N. was now an active member of the relief effort. In today's vernacular, this daily meeting would have transpired in the CMOC. Although the meeting was held at a regularly scheduled time and place, that was all the structure the meeting had--every attendee was given the opportunity to speak and voice their concerns. Consensus was as important as a rigid decision making process.

²⁴ Seiple Thesis, 52.

Despite the fact that DoD deployed almost 1,400 short tons of equipment and 400 communicators to support relief efforts, communications between the U.S. military and NGOs were lacking. "Few of these organizations [NGOs] had their own communications systems, and they had to rely on host nation facilities. Some agencies did have single-channel HF radio, others made use of the International Maritime Satellite (INMARSAT) system, but in any case they did not have any spare capacity."²⁵ While the U.S. did at times provide communications support to NGOs working inside Iraq, there was no established communications system for military-NGO interface.

Two critical lessons emerge from Provide Comfort. First, the face-to-face military-NGO meeting an effective tool for coordinating relief efforts at all levels and locales during the operation. Second, the lack of a common communications infrastructure between the military and NGOs hinders relief efforts. While not manifested in this operation, the requirement to pass and receive timely, accurate information and have an information repository is crucial to the well-timed delivery of supplies, security, and a trusting relationship.

Sea Angel

The most difficult problems to overcome in determining both the need and the ability to meet the need were the almost total lack of communications with the affected areas.²⁶

Sea Angel was conducted as a humanitarian operation after Hurricane Marian pounded the Bangladeshi coastline for two consecutive days, destroying the road and rail

²⁵ United States European Command, *Operation Provide Comfort: A Communications Perspective*, Monograph (Rodelheim, Germany: 4 June 1992), 28.

²⁶ MGen Henry C. Stackpole, *Sea Angel*, Monograph, Undated. Tab A, page unnumbered. Further referred to as Stackpole Monograph.

networks and key communications facilities. With the NGOs already in Bangladesh, this lack of infrastructure hindered their ability to distribute the much needed supplies to the hardest hit areas. Underlying tensions between the NGOs and Bangladeshi government impeded the initial coordination of the relief effort. Then, further complicating the situation, U.S. military forces arrived.

To coordinate the political entities, military forces, and relief agencies, the Relief Activities Coordination and Monitoring Cell (RACMC) was created. "The RACMC represented strategic²⁷ awareness of the overall situation and a tactical discussion of how to move the assorted supplies to Chittagong²⁸." ²⁹ The cell's priority was to provide operational level guidance to the effort--the RACMC forwarded its relief effort priorities to the Military Coordination Center (MCC), today a CMOC, located at Chittagong. The Joint Task Force (JTF) Forward coordinated the efforts at the MCC, working closely with Bangladeshi officials, NGOs, and various countries' military components.

Communications between the military and NGOs at Chittagong took two forms: a daily meeting and radio communications.

General Stackpole described one of the military's roles in Sea Angel, writing, "The second major role played by the JTF staff, a role that developed over a period of days,

²⁷ The term "strategic" is used out of current Joint Publication context. The RACMC included JTF J-3 officers, US Embassy personnel, NGO workers, and Bangladeshi government officials, and functioned at the operational level.

²⁸ Chittagong was the location of the JTF Forward and was the "front-line" of the relief effort.

²⁹ Seiple Thesis, 120.

was that of coordinator among all the agencies trying to help."³⁰ To carry out this guidance, the MCC held a daily meeting to coordinate relief efforts throughout the area.

³⁰ Stackpole Monograph, Tab I, page unnumbered.

The reliance upon DoD's lift and communications capability compelled the NGOs to participate. This meeting brought together the tactical level workers and provided the forum for tactical level decision making. To the credit of the JTF staff, their even-handed, common sense approach led to an effective distribution of supplies by all the relief agencies.

Lacking a communications infrastructure, DoD forces established radio communications between the MCC, distribution points, and NGO/government warehouses around Chittagong.³¹ "Valuable communications support was another valuable asset supplied by the Marine Expeditionary Brigade (MEB). At one point, up to ten³² comm sites³³ were established in Bangladesh. These sites supported both the Bengali³⁴ government and a number of NGOs."³⁵ Capt Seiple points out that NGO expectations for this system were very high, writing, "In terms of relative expectations, that the military would be able to provide a working communications system, this comparatively poor performance was a major disappointment."³⁶ Despite the systems problems, whether real or perceived, CARE's after action report did not mention DoD provided communications as a shortcoming.

Participants of Sea Angel had two recommendations regarding communications.

³¹ CARE was the primary relief provider (NGO), and received most of the communications support.

³² Various accounts have the Marines supporting up to 17 sites.

³³ These communications sites were manned by DOD personnel and were in direct support of relief operations. The radio nets primary focus was to provide the civilian relief workers a coordination means.

³⁴ 5th MEB's Command History (see footnote 35) consistently used the term "Bengali" when referring to the Bangladesh government and people. Bengali is a province in India, located near the Bangladesh border, and was not involved in Operation Sea Angel.

³⁵ 5th Marine Expeditionary Brigade (MEB), *Command History, 2 August 1990 to 29 May 1991, Operations Desert Shield, Desert Storm, and Sea Angel*, Monograph, undated, page unnumbered.

³⁶ Seiple Thesis, 124.

First, General Stackpole³⁷ recommended a strategic level "study designed to develop a communications backbone that is as disaster proof as possible (regional and long range radio nets)." LtCol Anderson, the JTF J-3, wrote, "To function effectively, they [NGOs] will need some augmentation from U. S. communications assets. Consideration should be given to allowing NGO liaison personnel access to uncovered comm links."³⁸ These recommendations will be analyzed shortly.

Restore Hope

*When directed by the National Command Authorities, CINCCENT will conduct joint/combined military operations in Somalia to secure major air and sea ports, to provide open and free passage of relief supplies, to provide security for relief convoys and relief organizations operations, and to assist the United Nations/non-governmental organizations in providing humanitarian relief under U.N. auspices.*³⁹

This mission was unprecedented--military forces had never seen an order at this level explicitly directing security and assistance support to the U.N. and NGOs during a humanitarian operation. What was meant by "assist in providing humanitarian relief?" Was there a clear "division of labor" or were U.N., NGOs, and military forces to integrate as one team? What were the NGOs' expectations? As the CINCCENT planners prepared for this mission, was there the realization that the military-NGO relationship about to be forged would be the standard for the future?

Operation Restore Hope was a major media event as well, with a torrent of images of starving and malnourished Somalis flashing across America's TV screens at six

o'clock. Going in, the military had to be aware that the sooner relief began, the sooner

³⁷ Stackpole Monograph, Tab I, page unnumbered.

³⁸ LtCol Gary W. Anderson, *Operation Sea Angel; A Retrospective On the 1991 Humanitarian Relief Operation in Bangladesh*, Monograph, Naval War College (Newport, RI: 15 January 1992): 43.

³⁹ Chairman Joint Chiefs of Staff, "Somalia OPLAN," p. 5, as quoted in Jonathan T. Dworkin, "Restore Hope: Coordinating Relief Operations," *Joint Forces Quarterly*, no. 8 (Summer 1995): 15.

their mission would be accomplished. This unequivocally meant close coordination with a NGO community that was still foreign to the military, even after Provide Comfort and Sea Angel. Likewise, the NGO community knew its survival was based solely on the military--the NGOs previous Somalia experiences taught them the harsh lessons of lawless rule.⁴⁰

Somalia validated conclusions from the previous operations that the daily meeting between the military and NGOs provides the most effective coordination and information sharing. Once the first Marines landed, coordination between them, U.S. government officials (Disaster Assistance Relief Team (DART), part of U.S. Agency for International Development), and NGOs took place at a daily DART meeting. The Marines, wanting to establish an immediate presence in Mogadishu, assigned Col Hellmer a unique mission. "I was given that assignment (to start a Civil-Military Operations Center) with the broad mission statement of making it happen, and primarily acting as a liaison between the non-government organizations and other relief organizations to interface with the operational commander."⁴¹ Eventually, HOCs were established by the JTF in each of the eight designated sectors, along with CMOC cells. HOCs would gather and validate the NGOs' requirements and forward these requests to its respective CMOC for action. While the HOC and CMOC worked closely with the NGOs, U.N. officials also worked

⁴⁰ NGO's reported losses (looting and extortion) of up to 50% of their relief supplies before U. S. forces arrived.

⁴¹ Col Werner Hellmer, *Operation Restore Hope*, Transcript of Marine Corps Oral History Program. Mogadishu, Somalia, undated, page unnumbered.

closely with both organizations.⁴²

The austere environment forced a heavy reliance on single channel radio (SCR) communications. Because of the vast area and numerous NGOs, the JTF did provide some NGOs military SCR assets to enhance coordination (and to provide a measure of security for NGOs who did not have assigned military forces). Rather than enhancing control, NGO risk was actually increased⁴³--the radios were stolen by Somali thugs. This had the effect of compromising radio nets for a short time. NGOs that had military security teams assigned had access to military radios, however, these radios had a strictly military purpose, being linked to the COC rather than the CMOC. While some NGOs had their own SCR nets, these nets did not provide the necessary infrastructure for the military to be able to "tap into" them, allowing close coordination.

The most important lessons learned in Somalia are consistent with the two previous operations reviewed: the daily face-to-face meetings provide the best forum for coordination, and most NGOs do not have the organic communications assets to support military-NGO interfaces. Before military augmentation of NGO communications capabilities is decided upon, an assessment should be made to determine the utility of augmenting the NGOs.

⁴² For an in-depth analysis of the military, NGO, and U.N. relationship during Restore Hope, see Seiple Thesis, 145-181.

⁴³ LtCol Jeffrey W. Foley, European Command desk, J6Z, Contingency Operations Division, Joint Staff, telephone interview by author, 6 January 1997.

Support Hope

*It's amazing how quickly information can get around the local population and NGO community.*⁴⁴

Operation Support Hope differed from other humanitarian relief efforts in that the U.N. was in-charge and the U.S. military, like the NGOs, was a supporting agency. This did not preclude the need for a military-NGO interface, but did limit its scope. Entebbe, the main point of entry, was the initial CMOC location. Because of the military's lift capability, the NGOs were "driven" to coordinate at the daily CMOC meeting. This meeting took the form of other CMOC meetings--a loosely structured meeting where everyone spoke. As the operation expanded, additional CMOCs were established throughout the theater and used the same forum.

Support Hope had something none of the military's previous humanitarian operations had--a telephone communications infrastructure (albeit archaic by U.S. standards). This provided the CMOCs with the ability to coordinate without face-to-face encounters and proved to be somewhat effective from both the military and NGO viewpoint. Now, the NGOs could stay "in the field," call the CMOC, and request through voice or facsimile their requirements. Because the telephone system was located sporadically throughout the country, often communications relied upon the passing of messages by locals, but this was better than no communications at all.⁴⁵ The key lesson learned in Support Hope is that military-NGO coordination can be greatly enhanced by using the existing communications infrastructure.

⁴⁴ Col Steve Riley, Entebbe CMOC OIC, interview by author, 6 January 1997.

⁴⁵ Riley, 6 January 1997.

COMMON THEMES

From the four operations studied, NUMEROUS SIMILARITIES APPEAR. First, the most effective means of communications between the military and NGOs at the tactical level has been daily face-to-face meetings. Ironically, these CMOC meetings have become the military's focal point during relief operations, and the military has excelled in harmonizing itself with the NGO community. The Combat Operations Center (COC) or other tactical operation centers have taken a back-seat to the CMOC during humanitarian assistance operations. When operating in a non-permissive environment, the CMOC and COC should be separate but accessible to each other to provide ready coordination of military operations and relief efforts. The military shift in tactical awareness has resulted in ever-increasing trust by the NGOs. The second significant similarity is the NGOs' inability to provide themselves a robust communications capability which would allow communications integration with the military, other NGOs, host nations, and their respective headquarters. Fiscal and logistics constraints, coupled with a myriad of legal issues, make it unrealistic for most NGOs to support a large communications package. Viewing this situation, the third similarity emerges--the military commander's desire to support the communications structure of a relief effort to include NGOs. Finally, the NGOs must have a need to communicate with the CMOC. The CMOC must have a "value added" sense for the NGOs--if the CMOC can't offer them something tangible (lift, security, information, communications), they have no incentive to coordinate.

TODAY'S TOOL BAG

Today's communication interfaces at the tactical level between U.S. forces and NGOs can take three forms: meetings, SCR communications, and host nation infrastructure. While each form has inherent advantages and disadvantages, clearly the "lowest tech" but still the best form, the face-to-face meeting, has been the most utilized. This clearly does not preclude the necessary use of other communications means. Today's available tools as well as a search for new ideas and initiatives are critical for future mission accomplishment.

The Meeting

Noted during each humanitarian operation was the heavy reliance upon the daily meeting for coordination and information sharing. These meetings are of considerable value so long as specific parameters are applied to the meeting. First, the meetings must be conducted in an area that is "NGO friendly." If the NGOs are required to pass through multiple security checkpoints, wear identification badges, or follow strict procedures or rules, they are less apt to attend. Second, the meeting must be an open forum, with no individual or agency in charge (unless the NGOs decide to elect a meeting leader). Most NGOs desire to remain neutral, or at least give the allusion of neutrality--attending a meeting chaired by the military does not provide neutrality. Military CMOC personnel must remember their mission--coordinating and supporting the NGOs. "Warfighting" stays in the COC. Third, attending the meeting must provide utility to the NGO. With their personal security at stake in Somalia, the NGOs had a great desire to visit the CMOC daily, as Col Hellmer points out, "We met with the NGOs

every day and they did not hesitate to come into the airport."⁴⁶ Here, the utility was personal security, but it could be as simple as providing access to a telephone or as intricate as arranging to airlift supplies to a remote destination. It is essential that the NGOs leave the CMOC meeting each day with the feeling that the CMOC "did something for them." No matter what communications equipment the military and NGOs procure in the future, this daily CMOC meeting must continue. There will never be a substitute for face-to-face coordination.

Radio Communications

Surprisingly, the CMOC has never used a "CMOC Coordination" radio net, which could include the military (both U.S. and coalition), U.N. agencies, NGOs, and the host nation. Such a net would greatly aid in the decision making process, especially in the timeliness of low-level decision making. In Bosnia, U.S. forces have established an "unofficial" radio watch with NGO radios--some NGOs have provided a radio or base station to U.S. forces for "monitoring" their activities.⁴⁷ While the emphasis on this is "unofficial" (for neutrality purposes), the lesson is clear: any real-time communications between agencies enhances performance.

There are numerous reasons why such a radio net has not been established, but this should not preclude its consideration, given the appropriate situation. Foremost is the issue of security. As one of the basic tenets of military communications, security of radio nets is crucial to successful operations. If radios fall into "enemy" hands, the radio net

⁴⁶ Hellmer, unnumbered page.

⁴⁷ Mark Stiffler, Chief, National Military Command Systems Engineering Division at Defense Information Systems Agency, interview by author, 3 December 1996.

could be compromised. The intrusion or monitoring of a CMOC net has the potential for disaster--security forces dispatched to meet false alarms or ambushes, relief supplies moved to locations where they are not needed, or even media intrusion to get the "best scoop."

As shown in Restore Hope, both personal and equipment security must be considered when deciding to implement a CMOC net. In a non-permissive environment, it is crucial for the NGOs to maintain neutrality. Any association with the military could have a devastating impact on the relief workers' personal safety. In such a situation, however, the mere possession of valuable equipment will put both the relief worker and the equipment in jeopardy, regardless of the owner (military or NGO). Thus, from an accountability standpoint, the issuance of military radios to NGOs in such a situation may not be prudent. However, if NGOs are willing to use their own equipment to link into a net, accountability will not be an issue. At this point, it suffices to note that in a friendly environment, the establishment of a CMOC net would not have any security issues associated. However, in a hostile situation, great debate will occur before deciding on net establishment. If it determined to establish this net, many political, fiscal, and security problems will require resolution based on the exact distribution of equipment assets.

Although the military and some NGOs are capable of establishing sophisticated radio links, international and host national legal issues must be considered. First, the frequency spectrum, as defined by international law, is the property of the host nation. In an operation such as Restore Hope, where no recognized government existed, use of the spectrum was unrestricted. However, in Bangladesh, its government had control, thus

frequency allocation was at their discretion. The recent trend of selling portions of the frequency spectrum and charging for use of the spectrum continues to grow.⁴⁸ "This problem is not limited to the United States. Other nations have their own frequency allocations, and U.S. forces passing through or operating in another country potentially face frequency conflicts."⁴⁹ Although there was unlimited use of the spectrum in Somalia, frequency deconfliction problems still existed. "Even an austere signaling environment rapidly became crowded and required increasing attention to the 'deconfliction' of radio frequencies being used by the military units."⁵⁰ Once frequency issues are resolved, other issues such as power outage, "type approved" equipment, and usage locations must also be coordinated with both the host nation and between using organizations.

Another consideration is the ability of NGOs and the military to bring equipment into the relief area. In addition to the lift constraints both the military and NGOs encounter, individual country license fees, customs regulations, and the appropriate paperwork are required just to get the communications equipment in-country. "Politics of the arena may not let in the best technology,"⁵¹ stated Larry Roeder, an experienced relief worker with the State Department. While some of this may seem petty in light of the support which will be provided, host nation laws must be adhered to or the possibility exists that

⁴⁸ MSgt David A. Campbell, Marine Corps Frequency Manager at Marine Corps Systems Command, interview by author, 12 December 1996.

⁴⁹ Robert K. Ackerman, "Reshaping the Army Turns On Signal Corps Strengths, Assets," *Signal*, vol. 51, no. 1 (September 1996): 20.

⁵⁰ Col Kenneth Allard. *Somalia Operations: Lessons Learned* (Washington, DC: National Defense University Press, 1995), 78.

⁵¹ Larry Roeder, Policy Planning Advisor at the U.S. Department of State, interview by author, 12 December 1996.

equipment will not be authorized by host nation officials for use in their country.

Improving coordination through radio communications is constrained by the fiscal reality that supporting even one radio net is expensive. With numerous ways to power a radio system, it is obvious that the use of generators is not feasible for most NGOs in the field. Given NGOs' mobile requirements, one-time use batteries are the most reliable and flexible power source in most situations.⁵² Presented with this, NGOs are apt to shy away from a CMOC radio net--costs, logistics requirements (purchasing batteries, passing customs, flying radios into the country, and distribution), and utility of one radio net is not a "value added" incentive. It must be noted that many of the larger NGOs do bring radio systems for their exclusive use, and one more radio net would not cause concerns. However, for smaller NGOs, this is a major effort that may require resources beyond their capacity.

Operational success requires communications; successful communications requires interoperability. "Only with communications that will interoperate is it possible for military forces acting jointly to achieve their full potential,"⁵³ wrote Norman Augustine in his article on noninteroperability. These axioms hold true when applied to combat, humanitarian assistance, or disaster relief operations. Diverse military forces (not only U.S., but coalition as well), the U.N., and numerous NGOs add up to varied communications capabilities--in a word, noncompatibility. Without an agreed upon

⁵² This also applies for military units in circumstances where communications is limited to SCR.

⁵³ Norman R. Augustine, "The Causes of Noninteroperability," in *Control of Joint Forces*, ed. LtGen Clarence E. McKnight, (Fairfax, VA: AFCEA Press International, 1989), 227.

common operating environment (COE) for radio operations, one cannot expect that all relief participants will be capable of talking with the CMOC. An agreed upon COE between the U.S. government, U.N., and larger NGOs⁵⁴ will go a long way towards radio interoperability, and thus, more efficient and effective relief operations.

Host Nation Infrastructure

Support Hope offered the first view of host nation infrastructure, providing humanitarian relief communications support, when the CMOC and NGOs received limited commercial telephone support. For the most part, regions of the world where these operations occur will either have little to no infrastructure or facilities damaged beyond immediate repair. Bangladesh's communication infrastructure, for example, was destroyed by Hurricane Marian. Somalia's infrastructure suffered a different fate. "The Somalia infrastructure that had survived the civil war was destroyed as everything of value was stolen, and sold, or bartered for cash or services."⁵⁵ The military and NGOs will normally bring their organic systems, but this should not preclude the examination of host nation support. However, for the military or NGOs to even consider sole reliance on host nation communications would be fatal. In order to utilize host nation assets, it must be recognized that a permissive, secure environment is generally required. Telephone, radio, and data systems require constant upgrade and maintenance. Without repeaters, antennas, telephone lines, and most importantly, a management system, host nation assets are of little or no value.

⁵⁴ When developing a COE, the reality of coordination is that only the agencies listed will be solicited. Contacting every NGO and attempting to gain a consensus is impossible.

⁵⁵ Joint Task Force Somalia Facsimile, 21 April 1993.

Perhaps the most reliable communications to be found in developing countries will be their commercial telephone system. This may include everything from archaic analog systems which resemble spaghetti factories--wires everywhere with no apparent organization--to modern cellular systems with an extensive repeater network throughout the country. Whichever system is present, both have useful applications for interfacing the tactical level military and NGO communities. Either system, if capable, can provide voice and data circuits.

From the military perspective, any analog system can be interfaced given the right tools. Integration of commercial lines into the military switching⁵⁶ network provides great system flexibility and redundancy. NGOs do not possess switching capabilities, thus they are totally reliant on either commercial or military provided switches and telephones. Although analog telephone systems provide a great communications tool, many factors enter into the equation. First, these telephone lines are not free--thus, the NGO must be willing to pay for dedicated lines or access to them. Second, the relief worker may not have ready access to a telephone, as happened in Rwanda. Finally, the reliability of these telephone systems is suspect. They are affected much more by weather, distance, and manual operator requirements than U.S. systems.

Modern cellular systems provide more flexibility than analog systems and are the preferred choice of relief workers because of their size and capability.⁵⁷ However, their potential to support a large traffic volume is much more tenuous.⁵⁸ Depending on system

⁵⁶ Switches provide the means for processing and transferring telephone calls.

⁵⁷ Mark Wood, *Disaster Communications* (June 1996), Chapter 6, 29.

⁵⁸ When supporting disaster relief operations, it can be anticipated that the numerous repeaters required for telephone operation will be destroyed or damaged .

design, there can be bottlenecks (too little capacity compared to demand for service), limited range or loss of service due to repeater location and maintenance, or exorbitant costs related to this service. Secure military systems are not capable of interfacing directly with these systems, thus there is total reliance on the commercial company providing the service. Despite all these potential problems, if the cellular system can be used, one can anticipate superb interaction between the CMOC and NGOs, as well as with the U.N. and host nation.

As unbelievable as it may seem to modern society, many Third World countries still rely heavily on single channel radio communications. As such, during a humanitarian assistance operation, these systems may be available for use. Their most likely employment is an integrated military, NGO, and host nation radio net which would support operational level communications. The utility at the tactical level would be extremely restricted and is primarily based on the location of the host nation radio facilities.

By far, the least likely communications asset to be available is data (computer) network access. With the worldwide proliferation of the Internet, this powerful technology could be leveraged to significantly enhance tactical operations at a low cost. Access to the Internet would provide the means for rapid information sharing, data distribution, and even the forum for meetings (chat mode). However, the barriers to gain and maintain Internet access are great. The military and NGOs must have computers, telephone lines must be working, and data servers require constant attention. The reality is most nations that require the military-NGO team do not have the capability to provide access to this resource.

Today's tools are genuinely "low-tech" when compared to the available technology. However, given the operational locations, fiscal constraints, mobility and lift restrictions, and the lack of infrastructure, the military-NGO relationship and communications interfaces have done remarkably well. Now the challenge is seeing how we can become "high-tech" for future relief operations.

MOVING INTO THE 21st CENTURY

Perhaps the most ironic revelation to come from past operations is that despite the technology boom of the 1980s and 1990s, technology has not truly entered the tactical level military-NGO relationship. Today's battlefield is high-tech, complex, fast paced, vastly expanded, and information driven--and rapidly becoming the same are the humanitarian assistance and disaster relief "battlefields." At a conference on communications management on recent Africa operations, participants "recognized that using faster, broader, and more consistent information gathering and dissemination methods and tools supported the goals of information sharing--saving lives, reducing risks, and cutting costs."⁵⁹ It is the responsibility of both the military and NGOs to explore new technologies for practical solutions to the interface problem. The question is, are there systems which are affordable, reliable, flexible, manageable, and durable enough for the tactical environment that is associated with relief work?

⁵⁹ United States Institute of Peace, *Managing Communications: Lessons From Interventions In Africa*. Draft Report from Discussion Groups. Downloaded from Netscape Navigator, 2 December 1996, 2.

Radios

As previously discussed, one of the problems faced today is interoperability amongst communications systems; this holds especially true for radio systems. Obtaining an agreed upon COE, while solving part of the problem, still could leave some NGOs, host nations, and coalition forces without radio communications because of their non-compliance. The only actual means of providing a fully compatible radio system is to procure and distribute the system to all participants. Obviously, this involves a significant cost that government funds (either U.S. or another nation contributing to the effort) provided towards relief would have to cover--NGOs do not have the budget for such an expenditure. These packages could fall under the "foreign aid" category when the equipment is turned over to the host nation at the end of the operation.⁶⁰

The solution to the fully compatible radio system problem is a cheap, disposable radio system ("throw-away") that could be provided to participants willing to follow communications procedures.⁶¹ Commercial-off-the-shelf (COTS) equipment that can be easily purchased in large quantities would provide participants a ready means of communications, while providing the military an intelligence and coordination means. The NGOs benefits are immediate communications with the CMOC, a degree of protection (via immediate requests to the CMOC), and cost-savings (not having to purchase equipment and batteries).

The military's equipment must be compatible (interoperable) with the majority of

⁶⁰ This assumes a government is in-place and can accept the equipment (i.e., Bangladesh). If there is nobody to turn the equipment over to or the desire is to retain the equipment, it can be collected and refurbished for future use. Any losses or damages would have to be considered the "cost of doing business."

⁶¹ Mark Stiffler Interview, 3 December 1996.

NGOs (as well as the U.N., host nations, and coalition forces). DoD research, development, and acquisition must ensure that terminal and transmission systems are fully compatible or can be reconfigured to meet humanitarian operation requirements. Additionally, COTS radios should be purchased in sufficient quantities to support two simultaneous humanitarian relief efforts. Based on the four operations reviewed, it can be anticipated that between 70 and 100 NGOs will participate. Given this baseline, procurement of a combination of 300 radios and base stations (150 per operation) could support NGOs, military forces, coalition forces, U.N. agencies, and host nations. Forward based units (i.e., Marine Expeditionary Units) and rapid reaction forces (air alert units) should maintain a portion of these, while the remainder should be controlled by the Joint Communications Support Element (JCSE) for contingency missions.

Cellular Telephones

During Operation Restore Hope, DoD utilized portable cellular telephone technology to enhance communications between the JTF, its components, the embassy, and U.N. staff. For its size, this COTS package delivers a powerful punch. Consisting of INMARSAT terminals, portable cellular sites (PCS), and cellular phones, this system is capable of interfacing with tactical military switching systems and the Defense Switched Network (DSN). Employed in Mogadishu (two PCSs) and aboard amphibious shipping (one PCS), the JTF had the capability of employing up to 90 cellular phones (30 per PCS). The major drawback is PCS location, which directly impacts the range and effectiveness of the system. Each cellular phone has to have the ability to "see" the PCS--distant travel, mountainous terrain, or urban environments will severely limit use. As seen in Somalia, "dense structures around the airport obscured the JTF antenna

and caused interference."⁶² Though this problem was resolved with the erection of a taller antenna, Mogadishu is not a typical urban area. Despite this drawback, one can quickly see the utility of such a system in humanitarian operations. Providing NGOs and other agencies cellular phones would rapidly provide mobile, reliable communications. As with the radio system, this system could either be provided to the host nation upon departure or re-employed in future operations.

Even though the current cellular telephone services discussed may seem technologically advanced, in fact, the emerging satellite based cellular networks will quickly antiquate these systems. Repeaters and PCSs will be replaced by Motorola's Iridium, Qualcomm's Globalstar, Ellipsat's Ellipso, Constellation's Aries, and TRW's Odyssey satellite systems. These systems are designed to allow users to move worldwide and still maintain telephone coverage. The system is best described as "the cellular system where you remain stationary and the cell moves."⁶³

Capable of fully integrating with ground based commercial telephone systems, the satellite systems provide maximum flexibility and reliability, especially in remote locations. DoD has begun investigating Globalstar, concerned with combat durability (NGOs will also be interested in the durability question) and secure voice options.

NGOs are always concerned with the fiscal aspect of relief operations. As can be seen by this comparison (Figure 3), today's initial cost is rather high for NGOs to absorb, however, the per minute charge is quite reasonable given the capability provided.

⁶² Col G.I. Wilson, "Mogadishu's Cellular Technology," *Marine Corps Gazette*, vol. 78, no. 9 (September 1994): 71.

⁶³ Joe Flower, *Iridium*, Monograph, Downloaded from Netscape Navigator, 22 January 1996, <http://www.hotwired.com/1.5/features/iridium.html>, 1.

Economics will decrease the price rapidly, and soon this technology will be affordable for NGOs. Extremely attractive for fiscal, logistical, and command and control reasons (for both the military-NGO and relief worker-NGO headquarters relationship), CMOCs will have a ready means of voice communications. NGOs should explore the feasibility

	Motorola's Iridium	Qualcomm's Globalstar	Ellipsat's Ellipso	Constellation's Aries	TRW's Odyssey
Number of Satellites	66.00	48.00	24.00	48.00	12.00
Cost (\$B)	\$3.37	\$1.6	\$.4	\$.29	\$1.3
Activation Date	1998.00	1998.00	1996.00	1996.00	1998.00
Telephone Price	\$3000	\$700	\$1000	\$1500	\$550
Price per Minute	\$3	\$.30*	\$.50*	\$.50*	\$.65*

Figure 3
SATELLITE SYSTEM COMPARISON⁶⁴

of these systems for their operations. The military should continue their research, ensuring that the chosen system is interoperable with commercial systems that NGOs will procure.

The capabilities of portable cellular telephone technology make it a viable option for future humanitarian operations. While siting, range, and security are concerns, the ability to obtain such an asset from within DoD (JCSE) will greatly enhance relief efforts. By maintaining two of these systems (with a minimum of three PCSs each), the military can quickly establish reliable communications amongst 90 users in remote locations.

⁶⁴ Joe Flower, 6.

Data Communications

Participants in breakouts on communications structures, who tended to have operational experience, described an effective (i.e., commonly relied on) communication system as one that provided transparent, accurate and consistent information about the theater (country, culture) and actors (who's there, with what), and up-to-date information about the locale, security, and assessment of needs. ⁶⁵

The emergence of data systems in the last five years has revolutionized military and civilian communications. The resultant impact will quickly spill over into the military-NGO relationship. What better tool is there to meet the needs articulated in the above quote? The ability to access the Internet from a remote location, to pass electronic mail (e-mail) seamlessly up and down the chain, and to transfer large standardized files will result in an information flow between the military and NGOs like never seen before. The challenge is harnessing these powerful tools and making these data systems practicable for users at the tactical level.

Is Software the Answer?

The trend today is to apply software solutions to the information flow problem in an attempt to enable relief workers to easily input and retrieve information on a near real-time basis. The U.N. and State Department have initiated software-based projects to advance the information flow to and from the relief worker (as well as the strategic and operational levels). Additionally, National Defense University (NDU) has contracted for a prototype software package "to create an unobtrusive means of coordinating information between the military and NGOs."⁶⁶ Examination of these "software

⁶⁵ United States Institute of Peace, 5.

⁶⁶ Jim Landon, Communications-Electronics Command (CECOM-USA) Coalition Decision Aids Project Manager at Evidence Based Research. Telephone interview by author, 6 January 1997.

solutions" will provide evidence that there is one crucial link missing: transmission systems. The real issue is how to resolve this shortfall.

ReliefWeb

The U.N. has developed ReliefWeb⁶⁷ for information sharing at the strategic and operational levels, as well as for the general public's use, through the Internet. ReliefWeb is a meta-database that is designed to combine time-critical information with already existent databases, providing the most accurate information available. Touted as "indispensable for emergency response,"⁶⁸ ReliefWeb tracks emergency situations from their onset to conclusion and is currently following 26 ongoing or potential crises. While ReliefWeb provides a tool for management, it does not offer easy access to the relief worker on-site, as it is completely reliant on the Internet or modem dial-ins through telephone line. Since ReliefWeb has no standardized reporting system for the tactical level, the State Department set out to alleviate this problem.

REMAP

In conjunction with about 20 NGOs, the State Department developed the Relief Emergency Mapping System (REMAP). REMAP is an experimental initiative designed for the tactical level worker to provide and access template based data systems.⁶⁹ Agencies (military, NGOs, U.N., host nation) with access to REMAP can update template information and forward this update to a U.N. database repository. The

information can be forwarded via the Internet or diskette (CDROM)--again, availability

⁶⁷ The author found the common spelling of "ReliefWeb" as one word.

⁶⁸ United Nations, *ReliefWeb Project Description, Press Release, and Mandate*, Press Release, downloaded from Netscape Navigator, 3 December 1996.

⁶⁹ Templates will vary for each operation, and may include information such as water points, refugee areas, danger areas (mines, unexploded ordnance, road conditions, airfields, and ports).

to the Internet enhances the software's potential. The information is fused by the U.N. and posted as part of ReliefWeb. To access updated REMAP information, either the Internet is required, or the military, NGOs, or CMOC will have to wait for a diskette to arrive with the revised data. Larry Roeder, REMAP designer, found three system shortfalls. First, without timely transmission and receipt capability, the information will be dated. Second, the relief workers needed an incentive to provide information. Third, if false or inaccurate information is provided, the system becomes unreliable and essentially useless.⁷⁰ Combating the first shortfall will be addressed shortly. Like attending CMOC meetings, if the relief workers find utility in providing the information, they will. To ensure only "trusted" sources have the ability to provide and receive information, some type of screening (validation of credentials) will be required before access to REMAP is granted. The U.N. must address this problem.

CiMi Link

While the U.N. and State Department focused on providing open access information, NDU⁷¹ aimed their software efforts on a direct civilian relief agency-military system, appropriately named the Civil-Military (CiMi) Link. NDU's initial proposal involved a highly intricate computer based system that the NGOs promptly rejected as "too high-tech." The NGOs desired a "low-tech" system that required minimal training, minimal input effort, no additional equipment,⁷² and most important, maximum value for their time.⁷³ The newly designed system is essentially commercial-off-the-shelf bulletin

⁷⁰ Roeder Interview, 12 December 1996.

⁷¹ NDU contracted this project to Evidence Based Research, and they are working directly with CECOM.

⁷² NGOs wanted a system that could operate on their 286 computers, 2400 baud modems, and could be transmitted through radio or telephone line.

board software--the twist is that the package supports both the military and NGOs and is part of the task equipment (T/E) and task organization (T/O) of the deploying military unit.

Outstanding CiMi Link issues are system management, data management, and transmission to remote sites (to be addressed separately under shortfalls). Although the initial proposal is to allow the military to manage the hardware and software, the potential exists for problems with the NGOs in this relationship. Software problems, inaccessible accounts, and system outages will fall directly on the military. Rather, the NGOs must provide a "system technician" to be located at the CMOC to overlook their interests. The military will send data representatives to install, operate, and maintain numerous data systems⁷⁴--adding one system will provide an additional burden, clouding their effort of priority.

Management of the data is envisioned as an adhoc committee (military and NGO representatives). That is, both have an equal say on which information is submitted for inclusion in the database. The military must hold back and remain an equal partner--this is a "joint" system and the NGOs' input is as valuable as the military's. While this may seem trivial, this can be a source of major conflict, especially with regards to the military's view of security. As information about locations of non-friendlies, landmines, and dangerous routes of travel are gathered and entered into CiMi Link, the military may have a pension to pull out information and regard it as intelligence (and possibly

⁷³ Landon Interview, 6 January 1997.

⁷⁴ At the joint level, at a minimum, data systems will include: Global Command and Control System (GCCS), Joint Dissemination Intelligence SubSystem (JDISS), Contingency Theater Automated Planning System (CTAPS), Secure Internet Protocol Routing Network (SIPRNET), and Non-secure Internet Protocol Routing Network (NIPRNET).

classifying the information) rather than raw data. The military and NGOs must establish inclusion and exclusion data criteria for the system as soon as possible (most likely when all have arrived on-site).

NDU's software proposal is by far the most viable of the three reviewed for military-NGO coordination. Its self-contained package eliminates interoperability problems with the all-inclusive T/E. This wide area in-country network is heading in the right direction. However, given the initiatives already launched by the State Department, NDU should coordinate their efforts and integrate REMAP into CiMi Link. NDU should also ensure that their software can be seamlessly merged into ReliefWeb (via the Internet or possibly GCCS). The only remaining issue is data transmission.

MOVING THE DATA--THE WEAK LINK

Unquestionably, the weakest link in these software solutions, or any computer network, is the transmission path. Transferring data requires extremely high path fidelity; the transmission path must be clear and stable. Data transmission can occur over numerous paths: radio, wire (host nation telephone infrastructure that has already been described), multichannel radio,⁷⁵ or satellite. In a humanitarian operation, any or all of these mediums could be used. The challenge for NGOs is choosing the medium that allows the movement of large volumes of data from remote locations to the CMOC and to outside of the theater.

⁷⁵ NGOs do not possess multichannel equipment. The security problems addressed under the satellite section are applicable to multichannel radio operations.

Radio

During humanitarian operations, larger NGOs employ high frequency (HF) and INMARSAT radios for their internal voice and data communications. HF radio presents an option for linking relief workers, but it presents numerous problems in its employment. Frequency selection, antenna selection, power output, and the weather all can have negative impacts on HF operations. Add to these potential problems the linkage of a computer and modem for data operations and one can quickly see that expert communicators are needed to keep the system functioning. Realistically, the effort to establish and maintain HF communications by NGOs will not happen. Rather, they need an easy-to-operate system, and INMARSAT fits the bill.

Both the military and selected NGOs have INMARSAT in their inventories--the challenge is getting the NGOs to want to use it for military-NGO coordination at the tactical level. INMARSAT technologies currently support four systems: INMARSAT A, B, C, and M. Each system is capable of high speed data operations; the primary differences are in cost and mobility. The obvious drawback for NGOs is \$5.00+ per minute charge. The technical details are easily resolved between the military and NGOs. Transferring data is the easy part--providing utility in the software for the NGOs is more difficult.

Data

Although not practical for moving data within the tactical level, current initiatives place a heavy reliance on the Internet (ReliefWeb and REMAP) for moving data to and from the tactical level. With the exception of radio and host nation infrastructure, NGOs do not have the means to conduct data transfer. Internal to the battlefield, CiMi Link can

require data transmission. One solution that has not been addressed is providing direct military support to the NGOs--that is, offering Internet access at the CMOC or offering computer access at remote sites. This solution opens a whole new set of problems, the most significant being the use of military equipment bandwidth to support the NGOs. Military multichannel (mux) and satellite systems are operated as classified systems--allowing NGOs access provides potential security problems. Separate, unclassified mux systems to support NGOs or additional satellite bandwidth would resolve the problem. But, with resources (personnel, equipment, and satellite access) already strained, can the military afford to support the NGOs? Resoundingly, yes--not supporting these data systems decreases the potential for timely, effective information sharing and coordination between the NGOs and the military. Ultimately, both share the same "battlefield" for the same purpose, humanitarian assistance. DoD must address the equipment sharing concept now--waiting until ReliefWeb, REMAP, and CiMi Link are firmly entrenched is too late.

Satellites and The Internet

For the ultimate in Internet surfing, a different sort of satellite network is needed.⁷⁶

Looming on the horizon (2002) is satellite technology, being developed by Bill Gates (Microsoft) and Craig McCaw (McCaw Cellular) that will free users of traditional Internet access requirements. Teledesic is an 840 satellite system that provides global Internet service based on its ability to see constantly the entire earth. The satellites will provide broadband access and allow high-speed data rates. With 840 satellites orbiting,

⁷⁶ "The Final Frontier," *The Economist*, vol. 340, no. 7976 (27 July 1996): 70.

entry into the Internet will almost be guaranteed, as a satellite will always be overhead and servicing only a small number of users.⁷⁷ Such a system will revolutionize tactical level communications.

Looking ahead, the technology is on the horizon for an integrated cellular telephone computer system that is as small as today's laptops, yet much more powerful. Relief workers will only have to raise a small antenna (like on a cellular phone), type in their information, and hit the "send" button. The information will race across satellite systems and be automatically downloaded into a computer database that will update itself immediately. If logged on, users will have their database automatically updated. Those who are not logged on will have their systems updated as soon as they connect. Communications between the military and NGOs will become as routine as placing a telephone call is today--and thus overall coordination will be enhanced.

Practice Makes Perfect

The final solution to solving communications and interoperability problems is the most obvious, yet the most difficult. The military routinely conducts training exercises for non-combatant evacuations, amphibious operations, raids, and reconnaissance missions. Not surprisingly, exercises for humanitarian assistance and disaster relief are not conducted, much less discussed by commanders. Military operations other than war (MOOTW) documents rarely address in detail the intricacies and nuances of these operations. One of the lessons from Provide Comfort on military-NGOs relations was the need to "recognize that coordination and integration of civilian organizations poses a

⁷⁷ "The Final Frontier," 70.

special problem for military forces in their operations. Senior leader training needs to address this issue."⁷⁸ When deployed for one of these assignments, commanders, their staff, and troops are "starting from scratch." Whether the military likes it or not, America expects to see U.S. troops at the forefront of these operations. The sooner the military comes to the realization that these operations are as complex, difficult, and dangerous as combat, the sooner training towards them can begin.

Now is the time to begin dialogue with the NGOs. One author suggests, "Involve NGOs in humanitarian assistance operation planning, particularly through exercises and wargames that use humanitarian assistance operation scenarios."⁷⁹ Communications discussions could include the format of the CMOC daily meeting, assessing the feasibility of military-provided support to NGOs, radio type, frequency, and antennas, determining prepositioned assets that could support NGOs, and software interfaces for data systems. If the military waits to coordinate, the potential for noninteroperability of communications equipment increases exponentially.

⁷⁸ Center for Army Lessons Learned (CALL), U.S. Army Combined Arms Command (CAC) Newsletter No. 92-6, *Operations Other Than War, Volume I, Humanitarian Assistance* (Fort Leavenworth, KS: U.S. Army CAC, December 1992), 18.

⁷⁹ Balbeer K. Sihra, "Relief Agencies and the U.S. Military: Partners in Humanitarian Operations." *Marine Corps Gazette*, vol. 78, no. 3 (March 1994): 43.

Conclusion

The US. military/NGO relationship is a fundamental trait of our present and the era into which we are entering. Its proclamations twofold: 1) interagency/multinational coordination will only increase; and 2) the role of civilians in military operations, no matter how pure the "battlefield," will also only increase.... It is our--both communities--responsibility to understand this relationship prior to its implementation in the field.⁸⁰

There is no doubt that future military missions will include humanitarian assistance and disaster relief operations. Embodied in these operations is the inherent need for effective military-NGO communications. The military has a disproportionate requirement to communicate with the NGOs--the military's "ticket home" is when NGOs (or the U.N.) have the situation well in-hand. Military command and control techniques do not neatly apply to humanitarian assistance. Consensus building and unity of effort, not command and control, are key to military-NGO coordination. Although it is difficult to predict interoperability problems, the JTF must be capable of operating with a wide range of organizations whose equipment does not interoperate with its own. Perhaps the current way of "communicating" will suffice, perhaps commercial-off-the-shelf technology is the answer, or perhaps the answer is some form of technology not yet introduced. Whatever the answer, both the military and NGOs must be committed to fully utilizing current technologies and investigating new methods for coordinating at the tactical level. Humanitarian assistance and disaster relief operations will continue to require unity of effort and improved efficiency--the people we are helping are counting on our, the military and NGOs, dedication to this effort.

⁸⁰ Seiple Thesis, 281-282.

Bibliography

- 364th Civil Affairs Brigade. *Bangladesh: Disaster Response Organization and Resources.* Monograph. Portland, OR: November 1992.
- 5th Marine Expeditionary Brigade (MEB). *Command History, 2 August 1990 to 29 May 1991, Operations Desert Shield, Desert Storm, and Sea Angel.* Subject: "Deployment to Southwest Asia." Marine Corps Research Center Archives (Sea Angel files).
- Ackerman, Robert K., "Reshaping the Army Turns On Signal Corps Strengths, Assets." *Signal*, vol. 51, no. 1 (September 1996): 19-22.
- Albright, Madeleine K., U.S. Representative to the United Nations. "Strengthening the Coordination of Humanitarian Emergency Assistance." *Disam Journal*, vol. 16, no. 2 (Winter 1993-1994): 58-61.
- Allard, Kenneth, Col, USA. *Somalia Operations: Lessons Learned.* Washington, DC: National Defense University Press, 1995.
- Anderson, Gary W., LtCol, USMC. *Operation Sea Angel; A Retrospective On the 1991 Humanitarian Relief Operation in Bangladesh.* Monograph. Naval War College. Newport, RI, 15 January 1992.
- Anderson, Gary W., Col, USMC. J3 for Operation Provide Comfort. Electronic interview by author 7 January 1997.
- Augustine, Norman R. "The Causes of Noninteroperability." In *Control of Joint Forces*. Ed. LtGen Clarence E. McKnight, USA (Ret.), 227-230. Fairfax, VA: AFCEA International Press, 1989.
- Bedard, E.R., Col, USMC (CO, Regimental Combat Team 7). *Operation Restore Hope.* Transcript of Marine Corps Oral History Program. Mogadishu, Somalia: 12 March 1993.
- Bishop, Steven N., Capt, USAF. *A Historical Study of the Effectiveness of U. S. Security Assistance to Panama, Costa Rica, and Nicaragua.* Thesis. Air Force Institute of Technology, Air University, September 1986.
- Brannon, James R., Maj, USA. "Lessons Learned: Disaster Assistance Missions." *Engineer*, vol. 23 (February 1993): 26-27+.
- Brown, Jeff R., LCdr, USCG. *Non-Traditional Missions and the U.S. Military: Past, Present, and Prospects.* Monograph. Naval Postgraduate School. Monterey, CA: 1995.

- Bullock, Harold E., Maj, USAF. *Peace By Committee*. Monograph. School of Advanced Airpower Studies. Maxwell Air Force Base: February 1995.
- Butts, Kent H., LtCol, USA, *The Department of Defense Role in African Policy*. Strategic Studies Institute: US Army War College; 17 March 1993.
- Campbell, David A., MSgt, USMC. Marine Corps Frequency Manager at Marine Corps Systems Command. Interview by author, 12 December 1996.
- Center for Army Lessons Learned (CALL), U.S. Army Combined Arms Command (CAC) Newsletter No. 92-6. *Operations Other Than War, Volume I, Humanitarian Assistance*. Fort Leavenworth, KS: U.S. Army CAC, December 1992.
- Center for Army Lessons Learned (CALL), U.S. Army Combined Arms Command (CAC). *Operation Restore Hope Lessons Learned Report*. Fort Leavenworth, KS: U.S. Army CAC, 15 November 1993.
- Coakley, Thomas P., *Command and Control For War and Peace*. Washington, DC: National Defense University Press, 1992.
- Combined Task Force Provide Comfort. Command Brief, 18 April 1991. Marine Corps Research Center Archives.
- Combined Task Force Provide Comfort. Command Brief, 4 May 1991. Marine Corps Research Center Archives.
- Commander, Joint Task Force (CJTF) Sea Angel II. Letter to subordinate commanders. Subject: Commanders Guidance. Undated.
- Commander, MARFOR/CG I MEF (Fwd). FragO 10, 11, 13, 14, 15, 16, and 17 for Operations Restore Hope. Marine Corps Research Center Archives.
- Curti, Merle, *American Philanthropy Abroad: A History*. New Brunswick, NJ: Rutgers University Press, 1956.
- Cushman, John H., *Command and Control of Theater Forces: Adequacy*. Washington, DC: AFCEA International Press, 1985.
- Dawson, David, Capt, USMC. *The U.S. Marines in Somalia: With Marine Forces, Somalia During Operation Restore Hope*. Monograph (draft). Undated. Marine Corps Research Center Archives.
- Defense Communications Agency, Joint Tactical Command, Control and Communications Agency. *Joint Connectivity Handbook*. Fort Monmouth, NJ, April, 1989.

Department of Defense (DOD) Directive 5100.46. *Foreign Disaster Relief*. Washington, DC: Department of Defense. December 1975.

Doel, M. T. "Military Assistance in Humanitarian Aid Operations: Impossible Paradox or Inevitable Development?" *Rusi Journal*, vol. 140, no. 5 (October 1995): 26-32.

Dworken, Jonathan T. "Restore Hope: Coordinating Relief Operations." *Joint Force Quarterly*, no. 8 (Summer 1995): 14-20.

"Emergency Communications Assets Respond As Disasters, Crises Loom." *Signal*, vol. 50, no. 2 (October 1995): 20-21.

Field Manual (FM) 11-23. *Theater Communications Command*. Washington, DC: Department of the Army. December 1975.

Field Manual (FM) 41-10. *Civilian Affairs Operations*. Washington, DC: Department of the Army. 11 January 1993.

Field Manual (FM) 100-23. *Peace Operations*. Washington, DC: Department of the Army. December 1994.

"The Final Frontier." *The Economist*, vol. 340, no. 7976 (27 July 1996): 70.

Flower, Joe. *Iridium*. Monograph. Downloaded from Netscape Navigator, 22 January 1996. <http://www.hotwired.com/1.5/features/iridium.html>.

Foley, Jeffrey W., LtCol, USA. European Command desk, J6Z Contingency Operations Division, Joint Staff. Telephone interview by author, 6 January 1997.

Fraser, Paul, SFC, USA. Joint Communications Support Element Operations Chief. Electronic mail interview by author, 2 December 1996.

Freeman, Waldo, MGen, USA, Lambert, Robert, Capt, USN, and Mims, Jason, LtCol, USA. "Operation RESTORE HOPE--A USCENTCOM Perspective." *Military Review*, vol. LXXII, no. 9, (September 1993): 61-72.

Gese, John. Joint Interoperability Test Center Engineer, Defense Information System Agency. Telephone interview by author, 10 December 1996.

Grayson, Robert W. "Evaluating The Impact of Strategic C3 System Performance." In *Science of Command and Control: Coping with Complexity*. Eds. Stuart E. Johnson and Alexander H. Levis, 122-128. Fairfax, VA: AFCEA International Press, 1989.

Grayson, Wallace C., Col (JTF Deputy J-3). *Operation Restore Hope*. Transcript of Marine Corps Oral History Program. Mogadishu, Somalia: 13 March 1993.

- Harvey, David. "Interview with Brig. Gen. Dick Mallion." *Defense Science*, January 1990, 17-18+.
- Hellmer, Werner, Col, USMC (Military Operations-MarFor Somalia). *Operation Restore Hope*. Transcript of Marine Corps Oral History Program. Mogadishu, Somalia: Undated.
- "High-Volume Network Shares Information Over Vast Reaches." *Signal*, vol. 51, no. 2 (October 1996): 41-43.
- Hoffer, Nicholas J., Col, USMC. U. S. Central Command J-6 Division Head, Current Operations and Plans. Electronic mail interview by author, 5 December 1996.
- Hopgood, Marvin, BGen, USMC (CG, 1st FSSG Forward). *Operation Restore Hope*. Transcript of Marine Corps Oral History Program. Mogadishu, Somalia: 27 January and 21 February 1993.
- Houston, Dan, Col, USMC (J-6 Sea Angel). Electronic mail interview by author, 3 January 1997.
- Hyde, John Paul, Warren, Joe B. and Kesson, Charles E. "C3 Planning in Crisis Response." In *Principles of Command and Control*. Eds. Jon L. Boyes and Stephen J. Anderson, 249-255. Washington, DC: AFCEA International Press, 1987.
- Irvin, Patricia L. "Role of DOD in Humanitarian Assistance." *Defense Issues*, vol. 9, no. 46 (1994): 1-4.
- Joint Chiefs of Staff. *National Military Strategy of the United States of America 1995*. Washington, DC: GPO, 1995. ISBN 0-16-045531-6.
- Joint Publication 1-02. *DOD Dictionary for Military and Associated Terms*. Washington, DC: Joint Chiefs of Staff. 23 March 1994.
- Joint Pub 3-0. *Doctrine for Joint Operations*. Washington, DC: Joint Chiefs of Staff. 1 February 1995.
- Joint Pub 3-07. *Joint Doctrine for Military Operations Other Than War*. Washington, DC: Joint Chiefs of Staff. 16 June 1995.
- Joint Pub 3-07.3. *Joint Tactics, Techniques, and Procedures for Peacekeeping Operations*. Washington, DC: Joint Chiefs of Staff. 29 April 1994.
- Joint Pub 3-07.6. *Joint Tactics, Techniques, and Procedures for Foreign Humanitarian Assistance* (draft).

- Joint Pub 3-08. *Interagency Coordination During Joint Operations* (Vol. I and II). Washington, DC: Joint Chiefs of Staff. 9 October 1996.
- Joint Pub 6-0. *Doctrine for C4 Systems Support to Joint Operations*. Washington, DC: Joint Chiefs of Staff. 30 May 1995.
- Joint Pub 6-02. *Doctrine for Employment of Operational/Tactical C4 Systems*. Washington, DC: Joint Chiefs of Staff. 1 October 1996.
- Joint Task Force Somalia. Facsimile (not addressed). 21 April 1993. Marine Corps Research Center Archives (Restore Hope files).
- Kennedy, K. M., Col, USMC. Personal letter not addressed. Subject: "BLT 2/5 Participation in Operation Sea Angel." 4 August 1993. Marine Corps Research Center Archives (Sea Angel files).
- Landon, Jim. *Enhancing The Civil-Military Interface in Complex Humanitarian Emergencies (CiMi Link)*. Monograph (Brief). Evidence Based Research (contracted by Advanced Concepts, Technologies, and Information Studies, Institute for National Studies, National Defense University). Undated.
- Landon, Jim. Communications-Electronics Command (USA) Coalition Decision Aids Project Manager, Evidence Based Research. Telephone interview by author, 6 January 1997.
- "Liberia: Better Coordination Needed, Despite Gains." *The Humanitarian Bulletin*, vol. 95/1 (12 October 1995). Downloaded from Netscape Navigator, 30 December 1996. [gopher://iccuc2.unicc.org/70/00/dha-online/bulletin/dhabult01](http://iccuc2.unicc.org/70/00/dha-online/bulletin/dhabult01)
- Lynch, David J. "When the Mission is Aid." *Air Force Magazine*, vol.. 76, no. 2 (February 1993): 60-64.
- Mangual, J.A., LtCol, USA. *The Department of Defense and Humanitarian Assistance*. Monograph. The Industrial College of the Armed Forces. Washington, DC: April 1993.
- McCarthy, Paul A. *Operation Sea Angel: A Case Study*. RAND no. MR-374-A, 1994.
- McKnight Jr., C.E. "Solving The Interoperability Problem." In *Principles of Command and Control*. Eds. Jon L. Boyes and Stephen J. Anderson, 382-288. Washington, DC: AFCEA International Press, 1987.
- Meek, Philip A., Col, USAF. "Operation Provide Comfort: A Case Study in Humanitarian Relief and Foreign Assistance." *Air Force Law Review*, vol. 37 (1994): 225-238.

- Mendel, William W. and Bradford, David G. *Interagency Cooperation: A Regional Model for Overseas Operations*. Washington, DC: National Defense University Press, March 1995.
- Metz, John M., Maj, USA. *Humanitarian Assistance Operations: A Command and Control Dilemma*. Monograph. U.S. Army Command and General Staff College. Fort Leavenworth, KS: 1995.
- Meyer, John J., Col, USA. "JTF Communications: The Way Ahead." *Military Review*, vol. 73, no. 3 (March 1993): 85-87.
- "Mobile Satellite Services Fit Tactical Military Operations." *Signal*, vol. 51, no. 3 (November 1996): 51-52.
- Mundy, Carl E, General, USMC. "The US Marines Are Old Hands at Humanitarian Intervention." *Armed Forces Journal International*, vol. 130, no. 7 (February 1993): 42+.
- Nalepa, Gerald F., Capt, USMCR. "Marine Corps Humanitarian and Disaster Relief Operations." *Marine Corps Gazette*, vol. 77, no. 2 (February 1993): 22-24.
- O'Kada, Ted. Director, Washington, DC Office, Food for the Hungry. Telephone interview by author, 2 January 1997.
- Oliver, Thomas W., *The United Nations in Bangladesh*. Princeton, NJ: Princeton University Press, 1978.
- Pace, Peter, BGen, USMC (Deputy CG MarFor Somalia). *Operation Restore Hope*. Transcript of Marine Corps Oral History Program. Mogadishu, Somalia: 18 January 1993.
- Reese, LtCol Robert J, USA. *Joint Task Force SUPPORT HOPE: Lessons For Power Projection*. Monograph. School of Advanced Military Studies, U.S. Army Command and General Staff College. Fort Leavenworth, KS: May 1995.
- Riley, Steven, Col, USA. Entebbe CMOC OIC for Operation Support Hope. Telephone interview by author, 6 January 1997.
- Robinson Jr., Clarence A. "Tactical Wireless Links Free Highly Mobile Battle Forces." *Signal*, vol. 51, no. 4 (December 1996): 17-20.
- Roeder, Larry. U.S. Department of State, Policy Planning Advisor. Interview by author, 12 December 1996.
- Ruark, Robert R., Maj, USMC. Office of the Assistant Secretary of Defense (Strategy

- and Requirements), Peacekeeping and Humanitarian Assistance. Telephone interview with electronic mail follow-up by author. 15 and 31 December 1996.
- Rudd, Gordon W., LtCol, USA. "The 24th MEU (SOC) and Operation PROVIDE COMFORT: A Second Look." *Marine Corps Gazette*, vol. 77, no. 2 (February 1993): 20-22.
- Rudd, Gordon W. *Operation Provide Comfort*. Monograph. Ph.D. Dissertation, Duke University, 1994.
- "Security Assistance Budget Request for FY 1996." *Disam Journal*, vol. 17, no. 3 (Spring 1995): 44-68.
- Seiple, Chris, Capt, USMC. *Square Dancing Into The Future: The U.S. Military/NGO Relationship and The CMOC In Times of Humanitarian Intervention*. Naval Post Graduate School Thesis. Monterey, CA: December 1995.
- Seiple, Chris, Capt, USMC. Action Officer, Strategic Initiatives Group, Planning, Policy, and Operations, Headquarters Marine Corps. Interview by author, 2 January 1996.
- Selvage, Donald R. "Operation Sea Angel: Bangladesh Disaster Relief." *Marine Corps Gazette*, vol. 75, no. 11 (November 1991): 89-97.
- Sharp, Trueman W., Cmdr, USN and others. "To Render Assistance." *U. S. Naval Institute Proceedings*, vol. 121, no. 10 (October 1995): 70-74.
- Sihra, Balbeer K. "Relief Agencies and the U.S. Military: Partners in Humanitarian Operations." *Marine Corps Gazette*, vol. 78, no. 3 (March 1994): 43-44.
- Smart, Major A. G., USA. *Military Support to Domestic Disaster Relief: Doctrine for Operating in the Wake of the Enemy?* Monograph. School of Advanced Military Studies, U.S. Army Command and General Staff College. Fort Leavenworth, KS: May 1993.
- Stackpole, Henry C., LtGen, USMC and Chase, Eric L. Col, USMC. "Humanitarian Intervention and Disaster Relief: Projecting Military Strength Abroad to Save Lives." *Marine Corps Gazette*, vol. 77, no. 2 (February 1993): 16-24.
- Stackpole, Henry C., LtGen, USMC. *Marine Corps Relief Operations in Bangladesh*. Transcript of Marine Corps Oral History Program. Naval Institute, Annapolis, MD: 29 April 1993.
- Stackpole, Henry C., MGen, USMC. *Sea Angel*. Monograph. Marine Corps Research Center Archives (Sea Angel files). Undated.

- Stackpole, Henry C., MGen, USMC. Letter to Commander-in-Chief, U.S. Pacific Command. Monograph. Subject: "Letter--Final Report of Operation Sea Angel." 20 June 1991.
- Stallings, Robert A. *Communications in Natural Disasters*. Monograph. Office of the Secretary of the Army (Office of Civil Defense). Washington, DC: January 1971.
- Starr, Barbara. "USA Considers C3 for UN Peace Operations." *Jane's Defence Weekly*, vol. 20, no. 4 (24 July 1993): 13.
- Stiffler, Mark. Chief, National Military Command Systems Engineering Division at Defense Information Systems Agency. Interview by author, 3 December 1996.
- Strategic Studies Institute. *Disaster and Intervention in Sub-Saharan Africa: Learning From Rwanda*. Washington, DC: GPO 1994.
- Task Force Mogadishu. Tactical Telephone Directory. Undated. Marine Corps Research Center Archives (Restore Hope files).
- Torrieri, Don J., *Principles of Military Communications Systems*. Dedham, MA: Artech House, 1981.
- Tuttle, Jerry O., VAdm, USN. "C3, An Operational Perspective." In *Science of Command and Control: Coping with Complexity*. Eds. Stuart E. Johnson and Alexander H. Levis, 1-6. Fairfax, VA: AFCEA International Press, 1989.
- United Nations. *ReliefWeb Project Description, Press Release, and Mandate*. Downloaded from Netscape Navigator, 3 December 1996. <http://www.reliefweb.int>.
- United States Congress. Senate. Committee on Foreign Relations. *Foreign Military Sales and Assistance Act*. 93rd Cong., 1st sess., 1973. KF 26.F6 1973f. S. Rept. 1443.
- United States Department of Commerce, National Telecommunications and Information Administration. *Manual of Regulations and Procedures for Federal Radio Frequency Management*. Washington, DC: September 1995.
- United States Department of State, U.S. Agency for International Development, Bureau for Humanitarian Response. *Field Operations Guide for Disaster Assessment and Response*. Washington, DC: GPO, June 1994. S 18.8:D 63 c.1.
- United States Department of State. *REMAPS ReliefWeb Emergency Mapping System*. Downloaded from Netscape Navigator, 12 December 1996. <http://www.state.gov/www/issues/relief/field.html>.

- United States European Command. *Operation Provide Comfort: A Communications Perspective*. Monograph. Rodelheim, Germany: 4 June 1992.
- United States Institute of Peace. *Managing Communications: Lessons From Interventions In Africa*. Draft Report from Discussion Groups. Downloaded from Netscape Navigator, 2 December 1996. <http://www.usip.org/june20.html>.
- United States Marine Corps. *Humanitarian Operations in Northern Iraq, 1991*. History and Museums Division, HQMC, Washington, DC, 1995.
- Vigoda, Marcy. "After the Storm: A Report of CARE Bangladesh's Response to the Cyclone." Monograph. CARE Bangladesh Information Unit. 28 August 1991. Marine Corps Research Center Archives (Sea Angel files).
- The White House. *A National Security Strategy of Engagement and Enlargement*. Washington, DC: GPO, February 1996. ISBN 0-16-048558-4.
- Wilson, G. I., Col, USMC. "Mogadishu's Cellular Technology." *Marine Corps Gazette*, vol. 78, no. 9 (September 1994): 70-71.
- Wood, Mark. *Disaster Communications*. First edition, June 1996. Downloaded from Netscape Navigator, 18 December 1996. <http://www.reliefweb.int/library/dc1/dcc1.html>.
- Zimmermann, Hans. United Nations, Department of Humanitarian Affairs, Emergency Telecommunications Office. Speakers Paper, World Telecommunications Forum, Strategies Summit, Telecom 95, Geneva, 1995. Downloaded from Netscape Navigator, 30 December 1996. <http://www.unog.ch/freq/01300493.bib>.
- Zinni, Anthony C., BGen, USMC. *Operation Provide Comfort*. Transcript of Combined Task Force Provide Comfort Historian. Incirlik Air Base, Turkey: 10 June 1991.